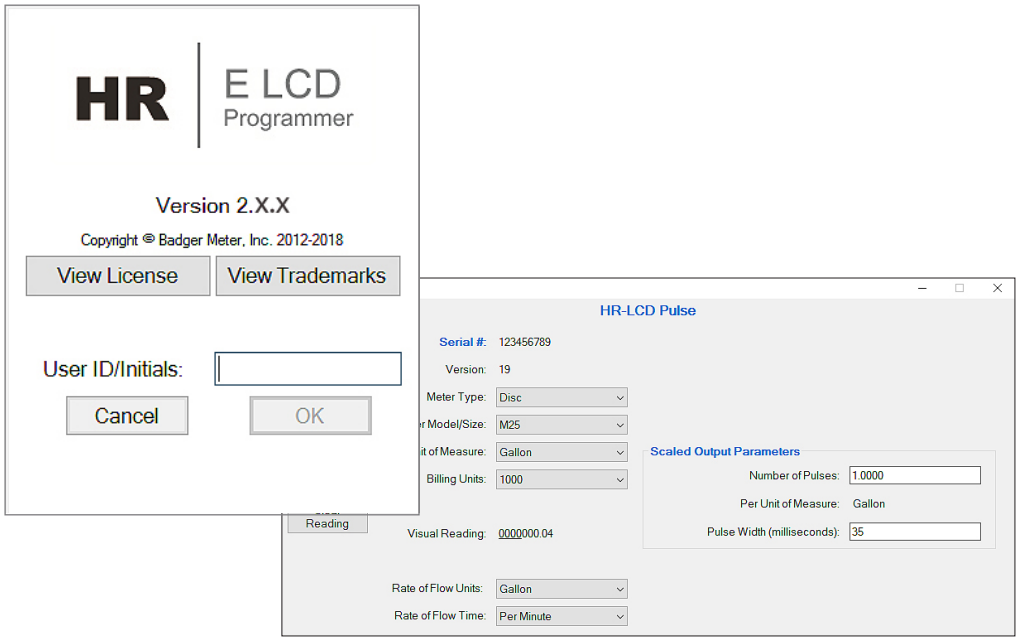
Badger Meter

High Resolution LCD Register

HR-LCD Pulse, HR-LCD 4-20 scaled/unscaled



REG-PM-02658-EN-03 (September 2023)

Programming Manual

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INTRODUCTION

This manual has instructions for programming the HR LCD Pulse and the HR LCD 4-20 scaled/unscaled high resolution (HR) LCD registers using the HR-E LCD Programmer software. Instructions for installing the Programmer software can be found in the *"Appendix" on page 17*.

Audience and Purpose

This manual is intended to be used by utilities for programming Badger Meter high resolution registers.

Additional Resources

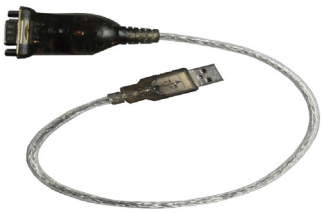
High Resolution LCD Registers User Manual, available at *badgermeter.com*

SYSTEM REQUIREMENTS

A computer with a Windows® 7 (or newer) operating system is required for programming HR LCD registers.

PARTS LIST

The following parts are available for programming HR LCD registers.

68468-001	Programming kit (USB)	Kit includes IR head bracket, programmer software (USB) and programming cable (USB)
67451-001	IR head bracket (***Included*** *in the 68468-001 kit)*	
67572-012	HR-E LCD encoder programmer software (USB) (***Included*** *in the 68468-001 kit)*	Available on USB flash drive
64436-042	IR programming and data profile cable (***Required***, *but* ***not included*** *in the kit)*	
64436-029	Serial-to-USB adapter *(Optional)*	

NOTE: Software version 2.0.x is required for programming the HR LCD registers.

IR HEAD BRACKET

To facilitate reading and programming multiple registers, the IR head bracket is recommended. The bracket is easy to attach and remove, and allows hands-free alignment of the programming cable IR head with the register IR port.

Attaching the Bracket to a Register

1. Open the register lid.
2. With the bracket guide pointing to the register lid hinge, slide the bracket onto the register so the guide fits on both sides of the register hinge (*Figure 1*).

   Push gently to make sure the bracket guide is completely seated against the register hinge, and you can see the IR port through the bracket opening as shown in *Figure 2*.

   NOTE: Moving the encoder lid up and down while sliding the bracket on helps to move the bracket into the correct position.

Figure 1: Slide bracket onto register

Figure 2: Bracket attached to register -IR port visible

3. Place the optical head of the IR cable in the bracket with the nubs on the back seated in the slots of the bracket. See *Figure 3*.

   This placement facilitates correct alignment between the IR head and the register IR port. The register is ready for programming.

Figure 3: IR head inserted

Removing the Bracket from a Register

To remove the bracket, hold the register with one hand and pull the bracket gently with the other hand, straight off the register. The bracket should pull off with little resistance.

USING THE PROGRAMMER SOFTWARE

Use the Programmer software to view and change the parameters that are currently programmed into the register, and program new parameters, if needed. You can also clear the register reading.

NOTE: If you need help installing the software, see the instructions *"Installing the Programmer Software" on page 17*.

1. Connect the IR programming and data profile cable (IR cable) to the serial port of the computer with the installed programming software.

   If the computer does not have a serial port, use a Serial-to-USB adapter. See the *"Parts List" on page 3.*

   NOTE: Connect the IR cable *before* you start the software to make sure the software recognizes the IR cable connection.

1. Double-click the **LCD Programmer** shortcut (*Figure 4*) to start the software application.

   The License Agreement displays the first time you access the software.

Figure 4: Software shortcut

2. Read the License Agreement and click **Accept License**.

   The License Agreement must be accepted by an authorized representative of the customer/licensee. If you select **Decline License**, the software application will not start.

   The splash (sign-in) screen displays (*Figure 6*).
   The screen includes the software version number and access to license and trademarks information.

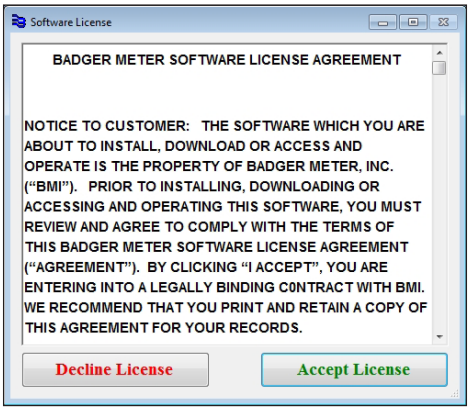


Figure 5: Software license agreement

3. Enter your initials in the *UserID/Initials* field.
   A user ID of 3…7 characters is required to activate the **OK** button.

   Then click **OK**.

   Your sign-in initials are used in the product log file to record any changes you make to the LCD register.

   The software *Programmer* screen opens.

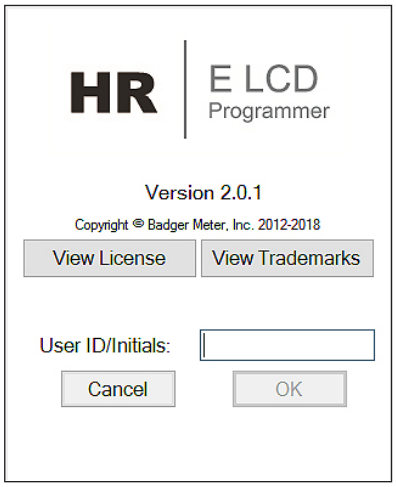


Figure 6: Splash screen

4. When the *Programmer* screen opens, select the correct COM port for the IR cable using the **IR Port** drop-down menu.

   NOTE: If the correct COM port is not selected, the software will be unable to read the register. For help with the COM port, see *"COM Port" on page 19*.

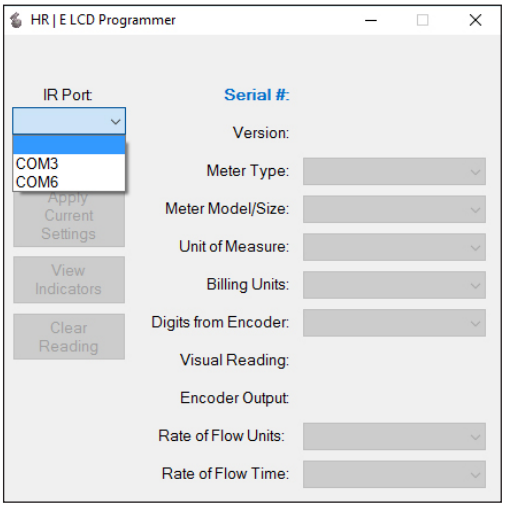


Figure 7: Select the COM port

Performing a Read

Align the IR head with the IR port of the register. Then click the **Read** button.

If the correct COM port is selected and a good response is received, the software determines the register type and populates the *Programmer* screen data fields as shown in *Figure 8*. For more information, see*"Register Types" on page 7*.

If the register is programmed the way you want, remove the IR bracket. If not, see *"Change Current Settings" on page 8*.

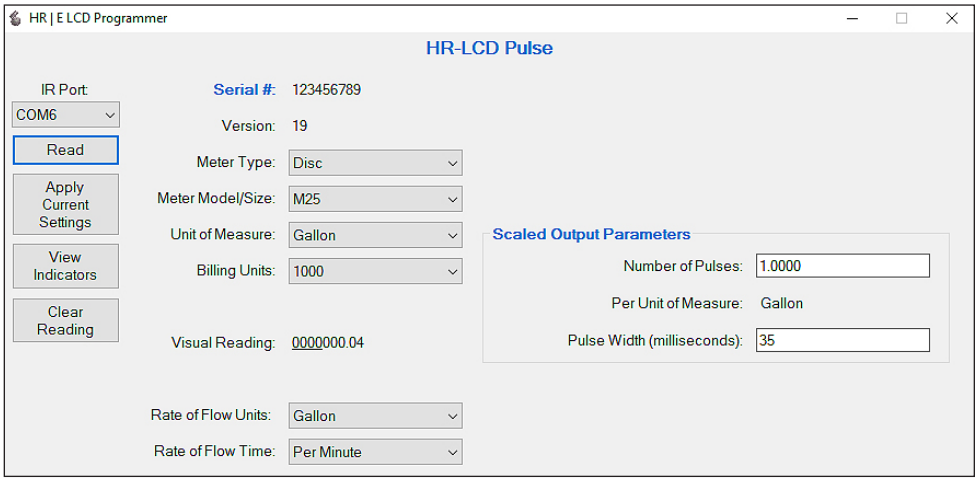


Figure 8: Register Read

Read Errors

If no COM port is selected, the error message in *Figure 9* displays. Click **OK**, select the COM port, and click **Read** again.

Figure 9: No COM port selected

Figure 10: Wrong COM port selected

If the *wrong* COM port is selected, the error message in *Figure 10* displays. Click **Cancel**, select the correct COM port, and click **Read** again.

Register Types

When you **Read** the register using the IR cable, the software automatically detects the register type. The device type and serial number display at the top of the screen. Software parameters that display vary depending on the device type. Examples of completed *Programmer* screens for both register types are displayed here.

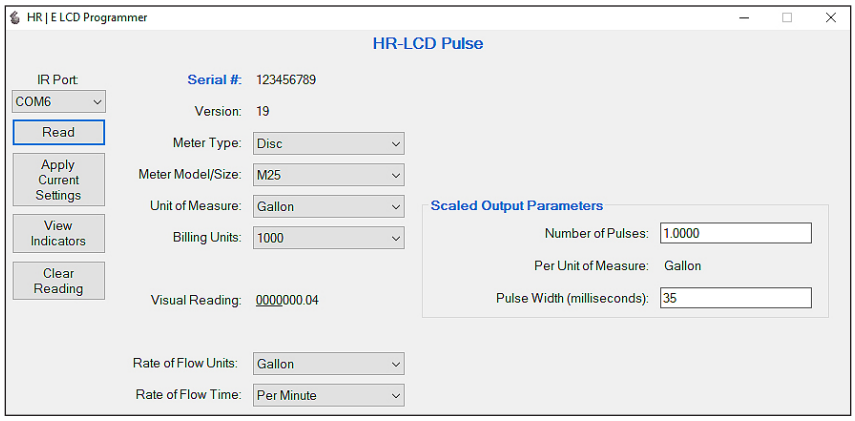


Figure 11: HR LCD Pulse register screen

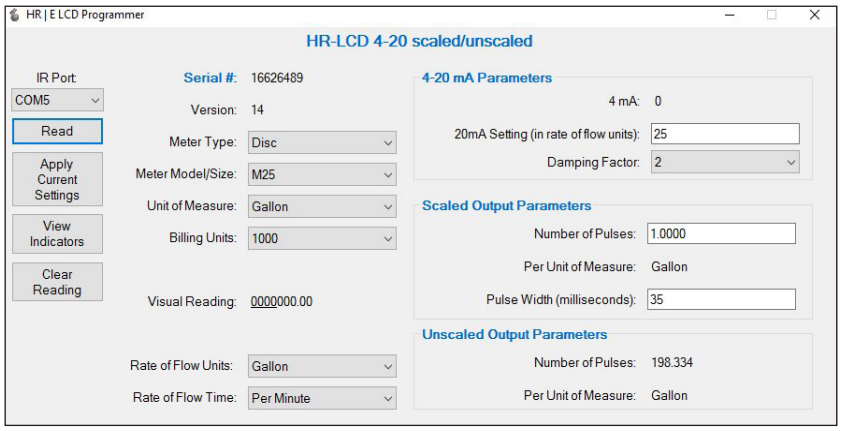


Figure 12: HR LCD 4-20 scaled/unscaled register screen

NOTE: The HR LCD Pulse register is used in the examples throughout this manual, unless otherwise indicated.

Change Current Settings

To change the register settings and set a new default value for any of the data fields, follow this procedure.

1. Click the drop-down menu to the right of the field to display a list of values.
2. Click the value you want to set as the default for that field.

NOTE: The field label changes to **bold** text, indicating a new, unprogrammed value is selected. See *Figure 13*.

You must set the default value for the *Meter Type* field before you set the *Meter Model / Size*. The *Billing Units* change automatically when you change the *Unit of Measure*. The *Unit of Measure* value does *not* have to be the same as the *Rate of Flow Units*. (Even in a cubic foot meter, the flow rate can be gallons per minute.)

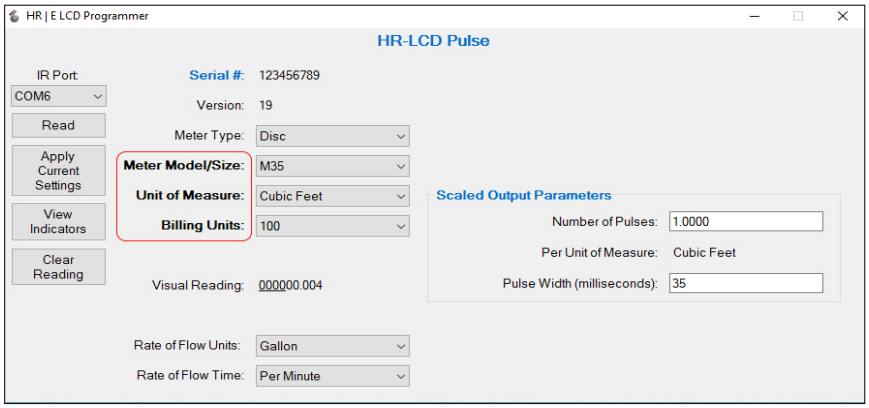


Figure 13: Unprogrammed values

Apply Current Settings

After changing a setting, you must apply the change to program the new value to the register.

With the IR head aligned, click **Apply Current Settings** to program the new values to the register.

The new values display on the screen and the field labels are no longer bold. The register also goes into storage mode. In storage mode, the register displays the *meter type, digit resolution from the register* and *unit of measure*. *Figure 14* is an example of a Model 35 Disc Meter register display with a 9-digit output, measuring in gallons.

Figure 14: Meter type, digit resolution from the register and unit of measure

Updating Multiple Registers

If you want to program multiple registers with the same settings, attach the IR head bracket with the IR cable to each register, one at a time, and click **Apply Current Settings** to program each register with the same settings.

NOTE: Do not **Read** the subsequent register(s) before clicking **Apply Current Settings**.

PROGRAMMER PARAMETERS

The Programmer fields are described in this section. The descriptions apply to both register types unless otherwise indicated. The HR LCD Pulse register is used in the examples unless otherwise indicated.

Serial # Field

The *Serial #* (number) field (*Figure 15*) is a read-only field that displays the factory-assigned serial number. You cannot change the serial number.

Version Field

The *Version* field (*Figure 15*) is a read-only field that displays the register version. You cannot change the version number.

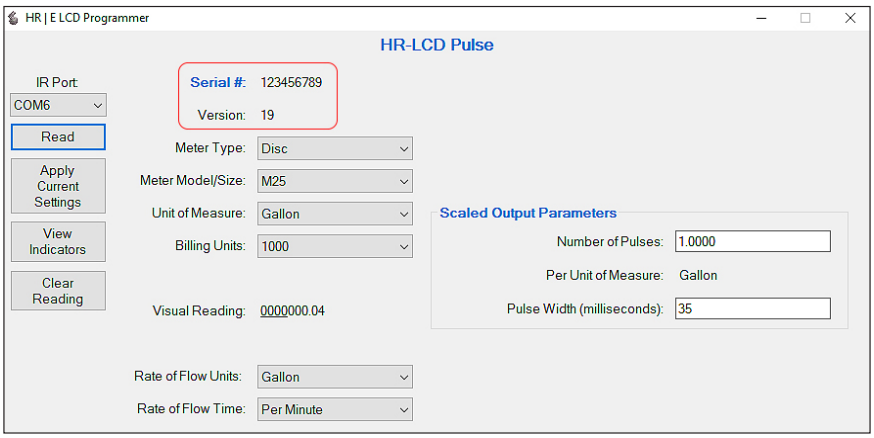


Figure 15: Serial and Version number

Meter Type Field

The *Meter Type* field (*Figure 16*) displays the type of meter to which the register can connect.

Click the drop-down menu to the right of the data field to select the Meter Type. Available options are Disc, CSM (Compound Series Meter), and TSM (Turbo Series Meter).

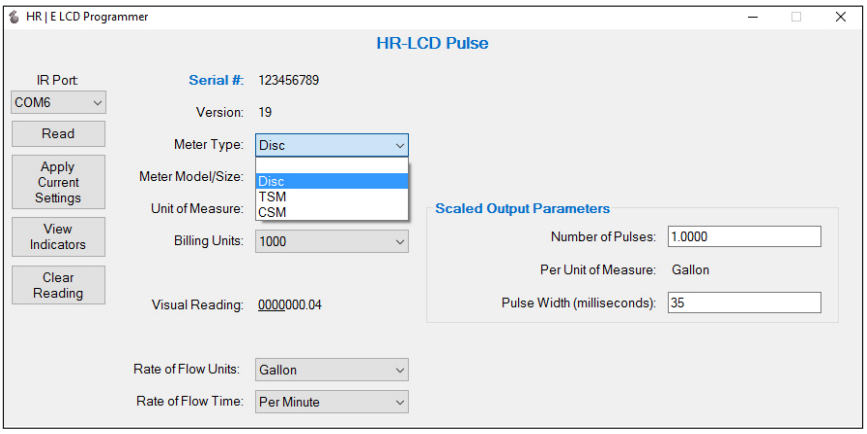


Figure 16: Meter Types

Meter Model/Size Field

The *Meter Model/Size* field (*Figure 17*) auto-populates based on the *Meter Type* selected.

Click the drop-down menu to the right of the data field to select a Meter Model. Meter Sizes corresponding to the Meter Models in the drop-down menu are shown in the table below *Figure 17*.

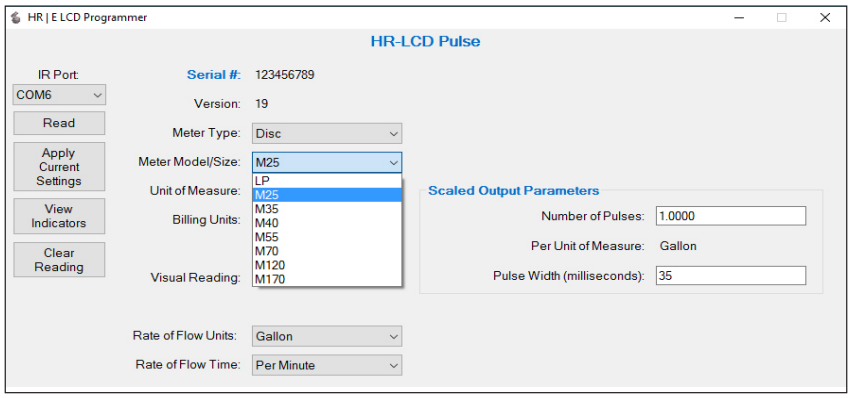


Figure 17: Meter Model and Size

For Recordall® Combination Fire Service meters and assemblies, refer to the **Disc** and **TSM** columns of the table.

Disc (inches)	Model	CSM (inches)	Model	TSM (inches)	Model
5/8, 5/8 x 3/4	LP	2	High Side	1-1/2	T160
5/8, 5/8 x 3/4	M25	2	Low Side	2	T200
3/4	M35	3	High Side	3	T450
1	M40	3	Low Side	4	T1000
1	M55	4	High Side	6	T2000
1	M70	4	Low Side	8	T3500
1-1/2	M120	6	High Side	10	T5500
2	M170	6	Low Side	12	T6200
				16	T6600
				20	T10000

Unit of Measure Field

The *Unit of Measure* field (*Figure 18*) displays the unit selected to measure the flow.

Click the drop-down menu to the right of the data field to select a Unit of Measure. The *Billing Units* field changes based on the Unit of Measure selection.

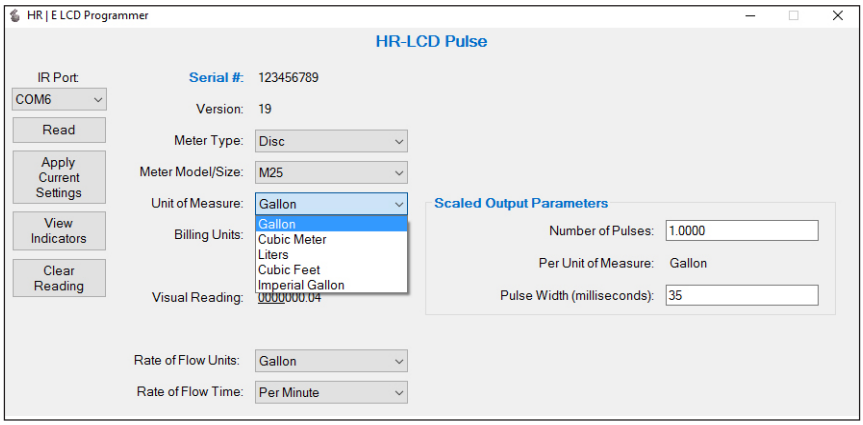


Figure 18: Unit of Measure

Billing Units Field

The *Billing Units* field displays the default units for which the customer is billed, and is indicated by dashed lines above and below the totalizer reading on the register display (*Figure 19*). The default is based on the Unit of Measure selected:

Unit of Measure	Default Billing Unit
Gallons, liters, imperial gallons	1000
Cubic feet	100
Cubic meters	1

Click the drop-down menu to the right of the data field to select a *Billing Units* value. If you do not want the dashed lines to display, select "**0**" (zero) as the *Billing Units* value (*Figure 20*).

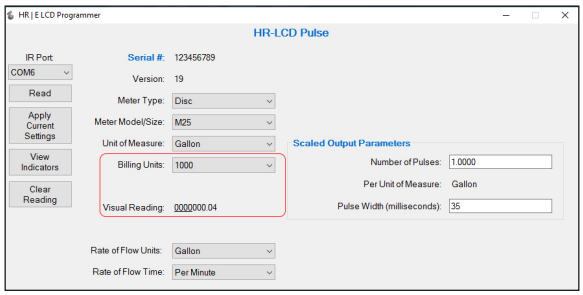


Figure 19: Billing Units value > 0 (zero)

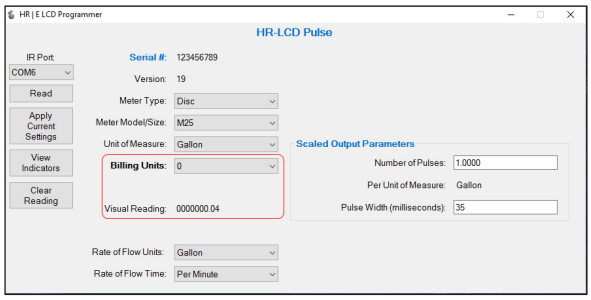


Figure 20: Billing Units value = 0 (zero)

Visual Reading Field

The *Visual Reading** field is a read-only field that displays the current meter reading as a real number. The number of decimal places is determined by the units and meter size. You cannot change this number.

*For TSM (Turbo) 12…20 inch meters, the value shown in the *Visual Reading* field may not display correctly. The programming value, however, is calculated correctly and will display correctly on the register.

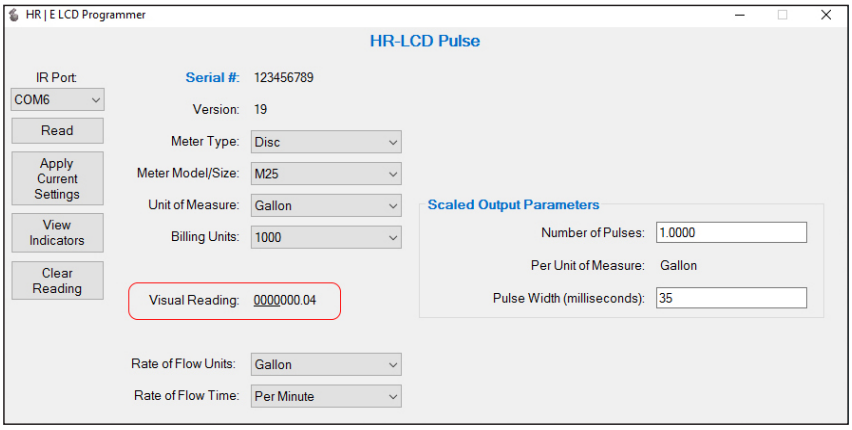


Figure 21: Visual Reading

Rate of Flow Units Field

The *Rate of Flow Units* field displays the unit by which the rate of flow is measured. The factory-programmed default is *Gallon*.

Click the drop-down menu to the right of the data field to select a Rate of Flow Units. The options are gallon, cubic meter, liters, cubic feet and imperial gallon as shown in *Figure 22*.

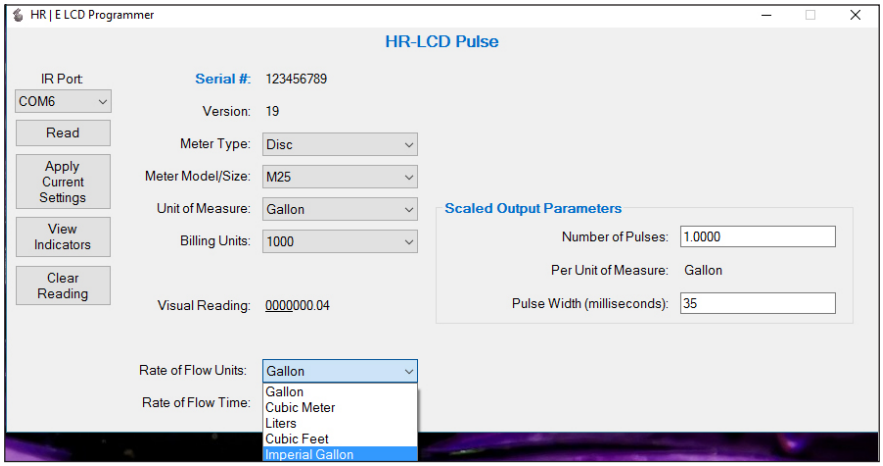


Figure 22: Rate of Flow Units

Rate of Flow Time Field

The *Rate of Flow Time* field displays the time unit set for the rate of flow. The factory-programmed default is *Per Minute*.

Click the drop-down menu to the right of the data field to select a Rate of Flow Time. The options are seconds, minutes or hours as shown in *Figure 23*.

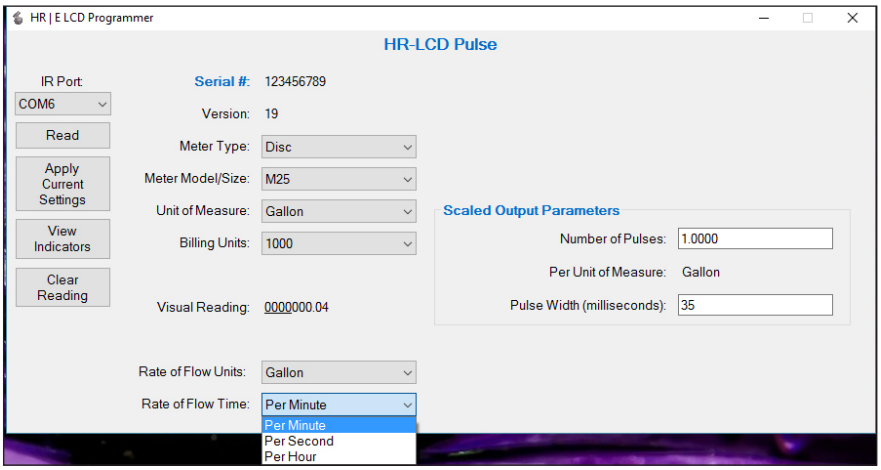


Figure 23: Rate of Flow Time

View Indicators

The **View Indicators** button (*Figure 24*) displays the current status indicators for the selected meter.

Status indicator options are Encoder Removal, 30 Day No Usage, Suspected Leak, Programmed, End of Battery Life, Reverse Flow, Magnetic Tamper and Temperature Limit Exceeded. See the *High Resolution LCD Registers User Manual*, available at *www.badgermeter.com*, for descriptions of these indicators.

1. With the IR head aligned, click **View Indicators**. The Status Indicators pop-up window displays (*Figure 25*).
2. To clear the indicators, click **Clear Indicators** in the pop-up window.

   NOTE: The **Clear Indicators** button does NOT clear the *Programmed* indicator.
3. Click **Close** to exit the window.

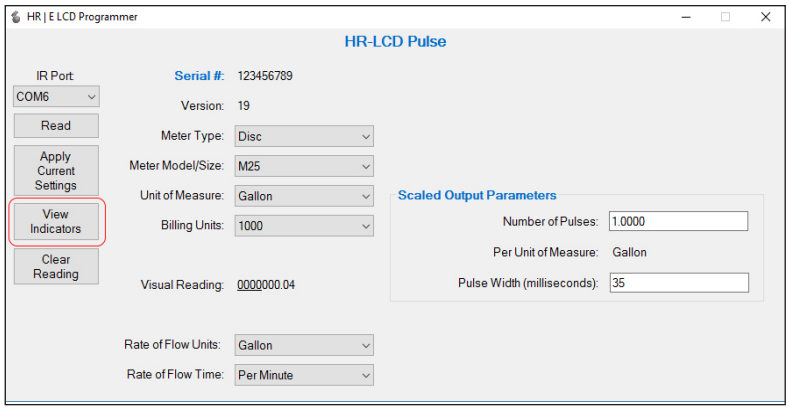


Figure 24: View Indicators

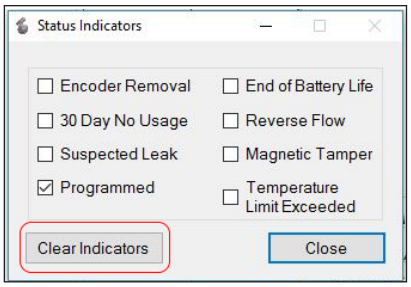


Figure 25: Status Indicators

Clear Reading

The **Clear Reading** button (*Figure 26*) deletes ALL readings for the selected meter.

IMPORTANT

If you select this option, a pop-up message displays (Figure 27), asking for a password to confirm the deletion. Contact Badger Meter Technical Support for the password.

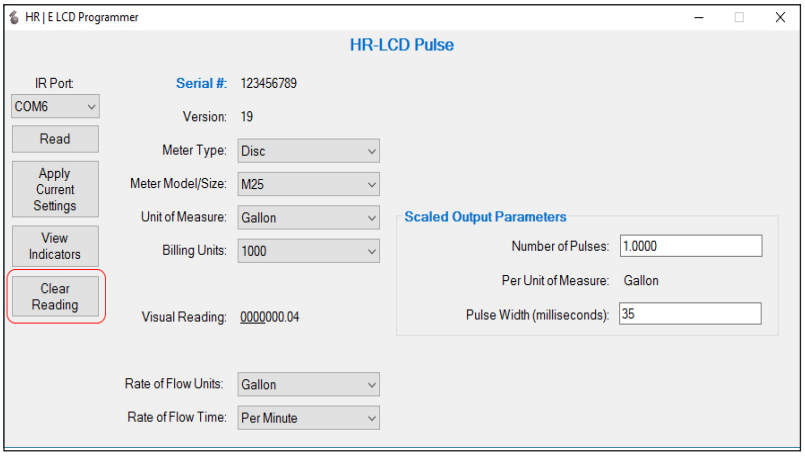


Figure 26: Clear all readings

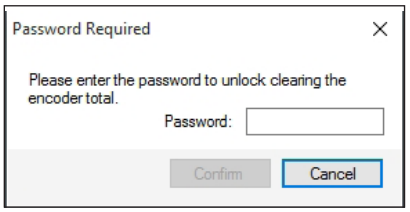


Figure 27: Password required

4-20 mA Parameters

NOTE: This field does not apply to the HR-LCD Pulse register.

The *4-20 mA Parameters* field (*Figure 28*) displays the parameters of the analog control signal. The 4-20 mA output signal is directly proportional to the meter rate of flow. For default measurement resolution values, see the Measurement Resolution charts in the *High Resolution LCD Registers User Manual*, available at *www.badgermeter.com*.

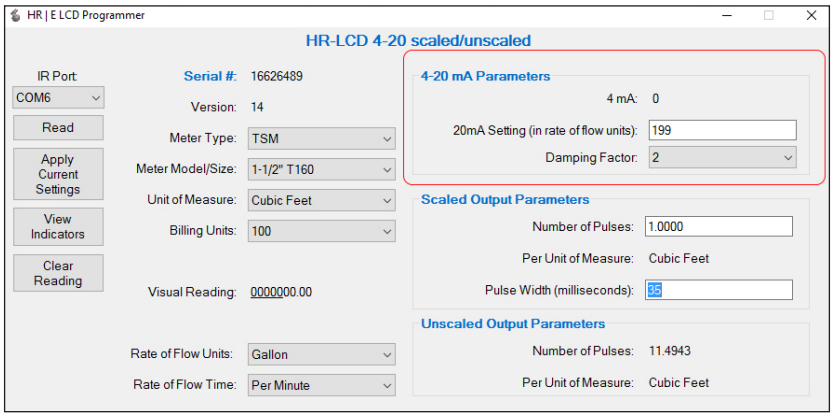


Figure 28: 4-20 mA Parameters

- The *4 mA* field is always set to zero (0). The register produces a 4 mA signal at zero flow.
- The *20 mA Setting* field displays the flow rate setting. Set this parameter to the flow rate at which the output should generate to maximum signal. In most cases, this is the maximum flow rate of the meter.
- The *Damping Factor* is the value used to stabilize the analog output signal.

Scaled Output Parameters

The *Scaled Output Parameters* field (*Figure 29*) displays the pulse output resolution for both registers. For default measurement resolution values, see the Measurement Resolution charts in the *High Resolution LCD Registers User Manual*, available at *www.badgermeter.com*.

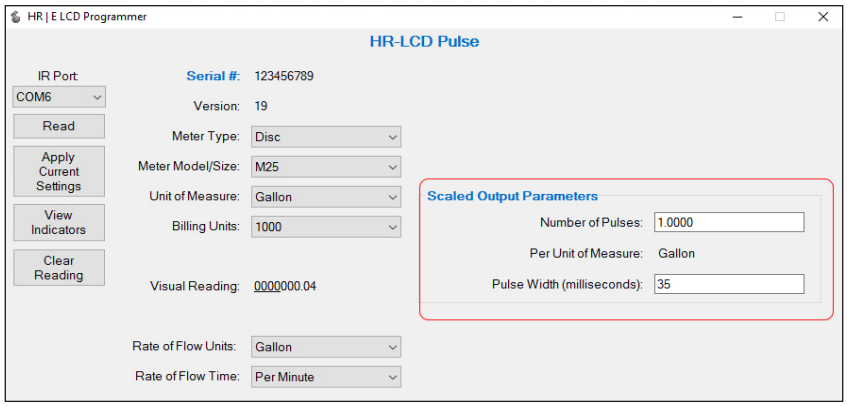


Figure 29: Scaled Output Parameters

- *Number of Pulses* field displays the number of scaled output pulses from the register.
  Number of Pulses (example, 10) per *Unit of Measure* (example, gallon) = *Number of scaled output pulses*.
- *Per Unit of Measure* field displays the unit that measures the flow of scaled output. The field auto fills based on the Unit of Measure selection on the left.
- *Pulse Width* determines the time that the output will be switched on.

Unscaled Output Parameters

NOTE: This field does not apply to the HR-LCD Pulse register.

The *Unscaled Output Parameters* field (*Figure 30*) represents

- The *Number of Pulses* field, which displays the number of unscaled output pulses, per Unit of Measure, from the register. You cannot change the value in this field.
- The *Per Unit of Measure* field, which displays the unit used to measure the flow of unscaled output. The field auto fills based on the Unit of Measure selection on the left.

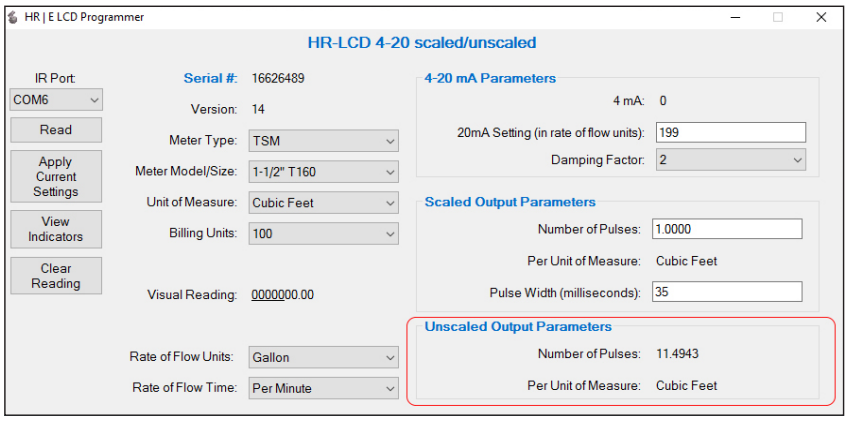


Figure 30: Unscaled Output Parameters

EXITING THE SOFTWARE APPLICATION

To exit and close the software application, click the **X** in the top right corner of the software screen as shown in *Figure 31*.

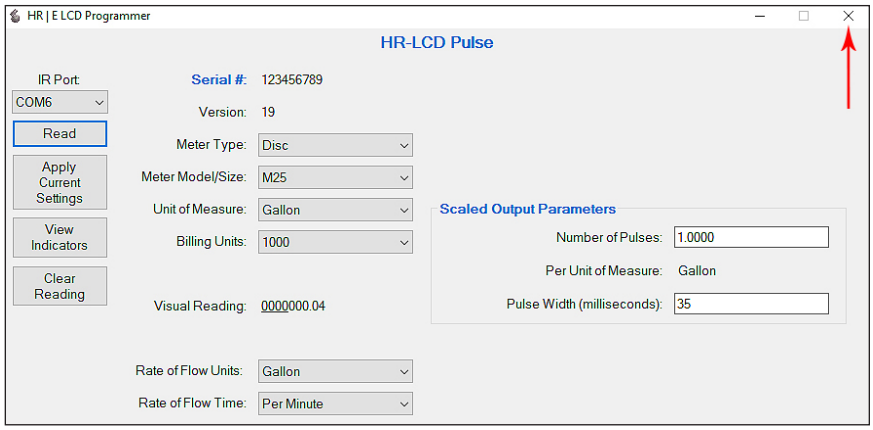


*Figure 31: Click the **X** to exit software*

APPENDIX

INSTALLING THE PROGRAMMER SOFTWARE

Follow these steps for installing the software.

1. Double-click the **setup.exe** file to begin installation. The *Welcome* screen displays.

Figure 32: Software Installer Wizard Welcome screen

2. Click **Next**. The *Select Installation Folder* screen displays.

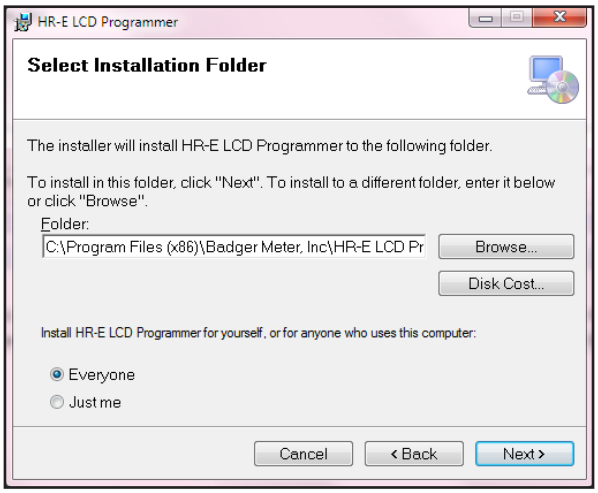


Figure 33: Software files location

3. Click **Next** to choose *Program Files,* the default location folder, or click **Browse** to choose another location. The confirmation screen displays.

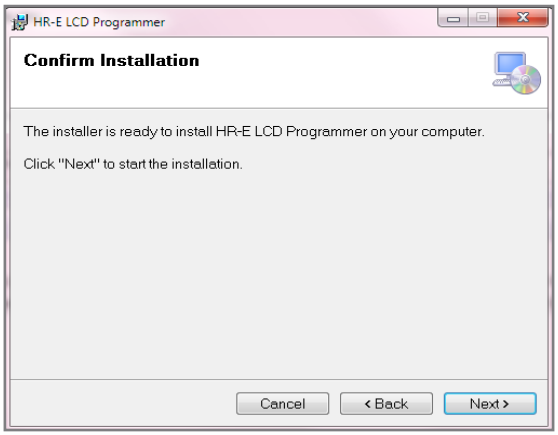


Figure 34: Ready to install

4. Click **Next** to start installation. A progress bar displays briefly (*Figure 35*). Then the *Installation Complete* screen displays (*Figure 36*).

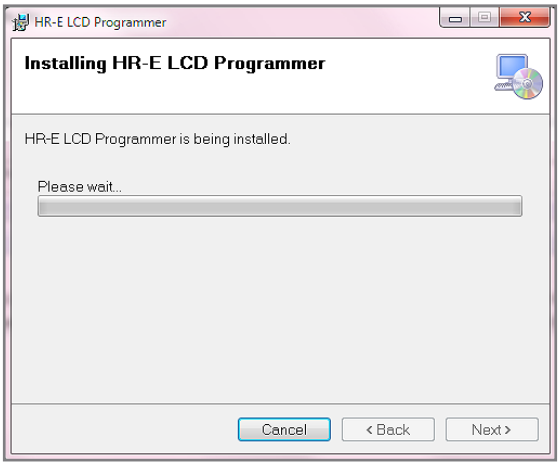


Figure 35: Progress bar shows installation in progress

5. At the *Installation Complete* screen, click **Close** to exit the installer. The Programmer shortcut displays on the computer desktop.

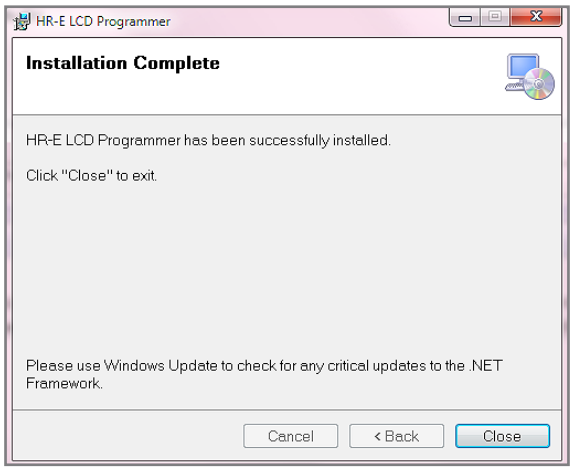


Figure 36: Installation complete

COM PORT

The Programmer software communicates with the register through the register IR port using the IR programming and data profile cable (IR cable). You must identify the correct communication (COM) port for the IR cable to make sure the software can communicate with the register. Follow these steps to identify the correct COM port for the IR cable connected to the computer.

1. Connect the IR cable to the serial port of the computer. If the computer does not have a serial port, use a serial-to-USB adapter.

   Follow these instructions to identify the COM port:

   - Select the Microsoft **Start** button.
   - Right-click **Computer***.
   - Select **Manage**.
   - Select **Device Manager** from the menu on the left.
   - In the Device Manager window, click the arrow next to **Ports (COM & LPT)** to expand the selection.
   - Find the COM port for the IR cable. The example (*Figure 37*) shows **COM 7** for the IR cable connected with a USB to serial adapter, "Prolific USB-to-Serial Comm Port."

2. Write down the COM port number for use with the Programmer software.

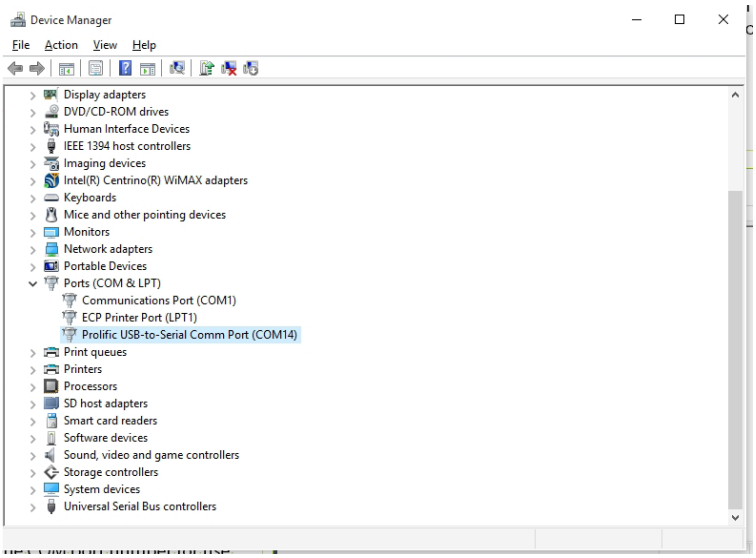


Figure 37: COM port in Device Manager window

* If you have Windows 8 or 10, type "Device Manager" in the **Search** field to open the Device Manager screen.

TROUBLESHOOTING

Issue	Probable Cause	Solution
Programmer screen is blank after a Read.	COM port not specified.	Select the correct COM port from the IR Port drop-down menu.
	Bad connection.	Check for damaged or broken wires.
Error message displayed after clicking an option on the programmer screen.	IR head not aligned with the device.	Align the head of the IR cable with the IR port on the device and try again.
Encoder alarm	While in regular operational mode, the device is tilted or removed from the meter.	Align the head of the IR cable with the IR port on the device. Keep the device still.

Also see *"Read Errors" on page 6*.

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